

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
29 April 2004 (29.04.2004)

PCT

(10) International Publication Number  
**WO 2004/035435 A1**

(51) International Patent Classification<sup>7</sup>: **B65G 53/22**,  
B65D 88/28

(21) International Application Number:  
PCT/EP2003/050722

(22) International Filing Date: 16 October 2003 (16.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
02079300.6 16 October 2002 (16.10.2002) EP

(71) Applicant (for AE, AG, AL, AM, AT, AU, AZ, BA, BB, BE, BG, BR, BY, BZ, CH, CN, CO, CR, CU, CY, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, FR, GB, GD, GE, GH, GM, GR, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU,

SC, SD, SE, SG, SK, SL, SY, SZ, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW only): **SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.** [NL/NL]; Carel van Bylandtlaan 30, NL-2596 HR The Hague (NL).

(71) Applicant (for CA only): **SHELL CANADA LIMITED** [CA/CA]; 400 - 4th Avenue S.W., Calgary, T2P 2H5 (CA).

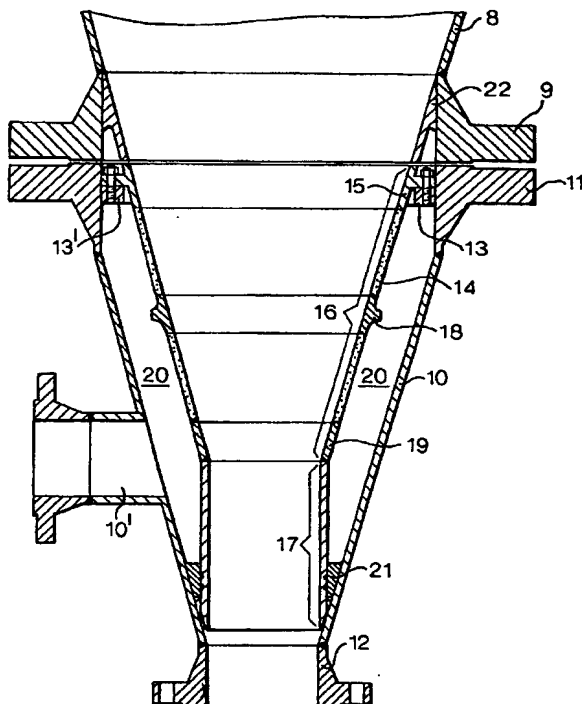
(72) Inventor; and

(75) Inventor/Applicant (for US only): **BERGGREN, Wouter Detlof** [NL/NL]; Badhuisweg 3, NL-1031 CM Amsterdam (NL).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: VESSEL FOR STORING PARTICULATE MATTER AND DISCHARGE DEVICE FOR USE IN THE SAME



(57) Abstract: The invention pertains to a vessel (1) for storing particulate matter, such as pulverised coal or fly ash, comprising a main part (2) and, at its bottom portion, at least one discharge device (3), which comprises a converging outer shell (10) and a permeable, converging inner shell (14) positioned in the outer shell (10), the discharge device (3) being connected to the main part (2) by means of a first flange (9) at or near the lower rim of the bottom portion of the main part (2) and a second flange (11) at or near the upper rim of the outer shell (10). The inner shell (14) is secured to the inner wall of the outer shell (10) of the discharge device (3), preferably to the inner wall of the second flange (11). Thus, the number of gaskets is reduced and/or the positioning of the inner shell becomes less critical.



(84) **Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/ 03/50722

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B65G53/22 B65D88/28

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B65G B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BE 881 146 A (HOOL VAN) 15 July 1980 (1980-07-15)	1-3, 5-9, 11-13
Y	page 4, line 13 -page 8, line 21	10
A	figures 1-4	4
Y	US 4 413 758 A (WALTERS ARMON J) 8 November 1983 (1983-11-08)	10
A	column 3, line 29 -column 5, line 54	1-9, 11-13
	figure 4	
A	GB 1 025 308 A (INSTITUT DE RECH S DE LA SIDER) 6 April 1966 (1966-04-06) page 1, line 61 -page 3, line 27 figures 1-3	1, 11
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

3 February 2004

Date of mailing of the international search report

20/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel: (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Papatheofrastou, M

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/ 03/50722

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A -	US 4 067 623 A (KLEIN HANS ET AL) 10 January 1978 (1978-01-10) column 2, line 60 -column 4, line 35 figures 1,2 -----	1,11

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/03/50722

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
BE 881146	A	15-07-1980	BE 881146 A2	15-07-1980
US 4413758	A	08-11-1983	NONE	
GB 1025308	A	06-04-1966	FR 85703 E	01-10-1965
			BE 650272 A	03-11-1964
US 4067623	A	10-01-1978	BE 827111 A1	16-07-1975
			ES 435972 A1	16-10-1976
			FR 2267006 A7	31-10-1975
			GB 1462556 A	26-01-1977
			ZA 7501552 A	25-02-1976